

CLAIMS

What is claimed is:

1. A method of making a leadframe, the method comprising:

providing a metal sheet;

patterning the metal sheet to form a frame and plurality of leads that extend from the frame and are integrally joined in an end block at an inner end portion of the leads; and

cutting the end block with a laser to singulate the inner end portion of each lead from the end block.

2. The method of claim 1, further comprising reducing a thickness of the end block prior to the cutting with the laser.

3. The method of claim 1, wherein the cutting of the end block forms a wide area and a narrow area on the inner end portion of each lead.

4. The method of claim 3, wherein the location of the wide area and the narrow area alternates on adjacent leads.

5. The method of claim 3, wherein the wide area and the narrow area comprise a wine-glass shape.

6. The method of claim 3, further comprising reducing a thickness of the end block prior to the cutting with the laser.

7. The method of claim 1, wherein the cutting of the end block forms at least two leads that are integrally joined.

8. The method of claim 7, wherein the two leads that are integrally joined are joined by a bar, and the combination of the two integrally joined leads and the bar encloses the other leads.

9. A method of making a leadframe, the method comprising:

providing a metal sheet;

patterning the metal sheet to form the leadframe, wherein the leadframe includes a dam bar and at least one block of metal within and connected to the dam bar; and

patterning the block of metal with a laser to singulate a plurality of individual leads, wherein at least an inner end portion of each lead is formed by said patterning with the laser.

10. The method of claim 9, further comprising reducing a thickness of the block of metal prior to the patterning with the laser.

11. The method of claim 9, wherein the patterning of the block of metal forms a wide area and a narrow area on the inner end portion of each lead.

12. The method of claim 11, wherein the location of the wide area and the narrow area alternates on adjacent leads.

13. The method of claim 11, wherein the wide area and the narrow area comprise a wine-glass shape.

14. The method of claim 11, further comprising reducing a thickness of the block of metal prior to the patterning with the laser.

15. The method of claim 9, wherein the patterning of the block of metal forms at least two leads that are integrally joined.

16. The method of claim 15, wherein the two leads that are integrally joined are joined by a bar, and the combination of the two integrally joined leads and the bar encloses the other leads.

17. A method of making a semiconductor package, the method comprising:
providing a leadframe including a plurality of leads within and connected to a frame, wherein at least an inner end portion of each lead is singulated by laser cutting;
mounting a chip on the leadframe;
electrically coupling the chip to the inner end portion of a plurality of the leads; and
encapsulating the chip and the inner end portion of the leads.

18. The method of claim 17, wherein the inner end portion of each lead has a lesser thickness than an adjacent remaining portion of the lead.

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19. The method of claim 17, wherein the laser cutting forms a wide area and a narrow area on the inner end portion of each lead.

20. The method of claim 19, wherein the location of the wide area and the narrow area alternates on adjacent leads.

21. The method of claim 19, wherein the wide area and the narrow area comprise a wine-glass shape.

22. The method of claim 19, wherein the inner end portion of each lead has a lesser thickness than an adjacent remaining portion of the lead.

23. The method of claim 17, wherein the laser cutting forms at least two leads that are integrally joined.

24. The method of claim 23, wherein the two leads that are integrally joined are joined by a bar, and the combination of the two integrally joined leads and the bar encloses the other leads.

25. A leadframe comprising:

a plurality of leads extending from a frame toward a central region enclosed by the frame, wherein at least an inner end portion of each lead is singulated by laser cutting.

26. The leadframe of claim 25, wherein the inner end portion of the leads has a lesser thickness than a second portion of the leads between the inner end portion of the lead and the frame.

27. The leadframe of claim 25, wherein the laser cutting forms a wide area and a narrow area on the inner end portion of each lead.

28. The leadframe of claim 27, wherein the location of the wide area and the narrow area alternates on adjacent leads.

29. The leadframe of claim 27, wherein the wide area and the narrow area comprise a wine-glass shape.

30. The leadframe of claim 27, wherein the inner end portion of each lead has a lesser thickness than an adjacent remaining portion of the lead.

31. The leadframe of claim 25, wherein the laser cutting forms at least two leads that are integrally joined.

32. The leadframe of claim 31, wherein the two leads that are integrally joined are joined by a bar, and the combination of the two integrally joined leads and the bar encloses the other leads.

33. The leadframe of claim 29, wherein the wine-glass shape of each of a first subset of the leads is oriented in a first direction, the wine-glass shape of each of a second subset of the leads is oriented in a second direction opposite that of the first direction, and individual leads of the first subset are situated in an alternating lateral pattern with individual leads of the second subset such that the wine-glass shape of adjacent inner end portions are oriented in opposite directions.

34. A semiconductor package comprising:

a plurality of metal leads, wherein at least an inner end portion of each lead is singulated by laser cutting;

a semiconductor chip electrically coupled to the inner end portion of a plurality of the leads; and

an encapsulating material covering the semiconductor chip and the inner end portion of the leads.

35. The semiconductor package of claim 34, wherein the inner end portion of each of the leads is between the chip and an adjacent second portion of the lead, and the inner end portion of the lead has a lesser thickness than the adjacent second portion of the lead.

36. The semiconductor package of claim 34, wherein the laser cutting forms a wide area and a narrow area on the inner end portion of each lead.

37. The semiconductor package of claim 36, wherein the location of the wide area and the narrow area alternates on adjacent leads.

38. The semiconductor package of claim 36, wherein the wide area and the narrow area comprise a wine-glass shape.

39. The semiconductor package of claim 36, wherein the inner end portion of each lead has a lesser thickness than an adjacent remaining portion of the lead.

40. The semiconductor package of claim 34, wherein the laser cutting forms at least two leads that are integrally joined.

41. The semiconductor package of claim 40, wherein the two leads that are integrally joined are joined by a bar, and the combination of the two integrally joined leads and the bar encloses the other leads.